In the claims:

1. (Currently amended): A system for ~~calculating~~ constructing an image of a radioactivity emitting source in a system-of-coordinates, the system comprising:

a radioactive emission probe of a variable-course motion;

a position tracking system, being in ~~communicating~~ communication with the radioactive emission probe and configured for tracking the position of the probe in the system-of-coordinates; and

a data processor, being ~~designed and~~ configured for receiving data inputs from the position tracking system and from the radioactive emission probe and for constructing the image of the radioactivity emitting source in the system-of-coordinates using a plurality of radiation detections received from the probe and the position of the probe during said detections as received from the position tracking system.

2. (Currently amended): The system of claim 1, wherein the radioactive emission probe is configured for ~~variable-course motion includes~~ free-hand scanning.

3. (Currently amended): The system of claim 1, wherein the radioactive emission probe is configured for movement ~~variable-course motion includes motion~~ within a body lumen.

4. (Currently amended): The system of claim 1, wherein the radioactive emission probe is configured for insertion via an endoscope ~~variable-course motion includes endoscopic motion,~~ through a trocar valve.

5. (Currently amended): The system of claim 1, wherein the radioactive emission probe is configured for movement~~variable-course motion includes motion~~ on a linkage system.

6. (Currently amended): The system of claim 1, wherein the data processor is further configured for receiving data inputs ~~the image acquisition is performed with~~from a wide-aperture collimator.

7. (Currently amended): The system of claim 1, wherein the data processor is further ~~designed and~~ configured to utilize an image acquisition and reconstruction algorithm, based on wide-aperture collimation--deconvolution algorithms, for image resolution enhancement.

8. (Currently amended): The system of claim 1, wherein the radioactive emission probe ~~is~~comprises ~~constructed as~~ a wide-bore-collimator probe.

9. (Currently amended): The system of claim 1, wherein the radioactive emission probe is ~~constructed as~~ a wide-angle collimator probe.

10. (Currently amended): The system of claim 1, wherein the radioactive emission probe comprises ~~is constructed as~~ a square collimator probe.

11. (Original): The system of claim 1, wherein the radioactive emission probe includes a single-pixel radiation detector and a single collimator.

12. (Original): The system of claim 1, wherein the radioactive emission probe includes a multi-pixel radiation detector and a single collimator.

13. (Currently amended): The system of claim 1, wherein the radioactive emission probe comprises ~~is constructed as~~ a grid collimator probe, having a plurality of collimator cells.

14. (Original): The system of claim 13, wherein each of the collimator cells includes a single pixel.

15. (Original): The system of claim 13, wherein each of the collimator cells includes a plurality of pixels.

16. (Original): The system of claim 1, wherein the radioactive emission probe includes at least two radiation detectors, each with a dedicated collimator.

17. (Original): The system of claim 16, wherein the dedicated collimators are not parallel to each other.

18. (Previously presented): The system of claim 1, wherein the radioactive emission probe is selected from the group consisting of a narrow-angle radioactive emission probe, a wide-angle radiation emission detector, a plurality of individual narrow angle radiation emission detectors, a spatially sensitive, pixellated, radioactivity detector, a Compton gamma probe, a tube collimator, a detector sensitive to gamma radiation, a detector sensitive to beta radiation, a detector sensitive to positron radiation, a detector sensitive to alpha radiation, and a combination thereof.

19. (Currently amended): The system of claim 1, wherein the radioactive emission probe is ~~operative as a position tracking pointer, by~~further configured to following~~ing~~ a three dimensional surface which defines the body curvatures, to define the position of the radioactivity-emitting source with respect to an outer surface of the body and to create a three dimensional map of both the radioactivity-emitting source and the body.

20. (Currently amended): The system of claim 19, ~~and further including a~~ configured for visual co-presentation of the radioactive emission probe.

21. (Currently amended): The system of claim 1, ~~adapted~~ configured for generating an image of the radioactivity-emitting source, selected from the group consisting of a two-dimensional image and a three dimensional image of count rates as functions of positions.

22. (Original): The system of claim 1, wherein the radioactivity emitting source is selected from the group consisting of a radiopharmaceutically labeled benign tumor, a radiopharmaceutically labeled malignant tumor, a radiopharmaceutically labeled vascular clot, radiopharmaceutically labeled inflammation related components, a radiopharmaceutically labeled abscess and a radiopharmaceutically labeled vascular abnormality.

23. (Currently amended): The system of claim 1, wherein the position tracking system

is selected from the group consisting of an articulated arm position tracking system, an accelerometers based position tracking system, a potentiometers based position tracking system, a sound wave based position tracking system, a radio frequency based position tracking system, an electromagnetic field based position tracking system, an optical based position tracking system, a position tracking system ~~adapted~~ configured for free-hand movement, and a combination thereof.

24. (Currently amended): The system of claim 1, wherein the data processor is further ~~designed and~~ configured for calculating a first position of the radioactivity-emitting source in a first system-of-coordinates and projecting the first position onto a second system-of-coordinates.

25. (Currently amended): The system of claim 1, and further including a structural imaging modality in communication with a structural-modality position tracking system, for constructing a structural image of a body component in a structural modality system-of-coordinates, wherein the radioactivity emitting source is a radiopharmaceutically labeled portion of the body component, and wherein the data processor is further ~~designed and~~ configured for constructing the structural image of the body component and the image of the radiopharmaceutically labeled portion of the body component in a common system-of-coordinates.

26. (Original): The system of claim 25, wherein the structural imaging modality is a two-dimensional imaging modality.

27. (Original): The system of claim 25, wherein the structural imaging modality is a three-dimensional imaging modality.

28. (Currently amended): The system of claim 25, ~~adapted~~ configured for a visual co-presentation of the body component and the radiopharmaceutically labeled portion of the body component.

29. (Original): The system of claim 25, wherein the structural imaging modality is selected from the group consisting of a fluoroscope, a computed tomographer, a

magnetic resonance imager, an ultrasound imager, an impedance imager, and an optical camera.

30. (Currently amended): The system of claim 1, and further including a structural imaging modality in communication with the position tracking system, wherein the data processor is further ~~designed and~~ configured for constructing a structural image of the body component and the image of the radioactivity emitting source in a common system-of-coordinates.

31. (Original): The system of claim 1, wherein the radioactive emission probe is an intracorporeal radioactive emission probe.

32. (Original): The system of claim 31, wherein the radioactive emission probe is an intracorporeal radioactive emission probe, mounted on a surgical instrument.

33. (Original): The system of claim 32, wherein the surgical instrument is selected from the group consisting of laser probes, cardiac and angioplastic catheters, endoscopic probes, biopsy needles, aspiration tubes or needles, resectoscopes, resecting devices, ablation devices, high-energy ultrasound ablation devices, tissue sampling devices, ultrasonic probes, fiber optic scopes, laparoscopy probes, thermal probes, suction probes, irrigation probes, and open-surgery devices.

34. (Currently amended): The system of claim 31, wherein the intracorporeal radioactive emission probe is ~~adapted~~ configured for detecting radiation, selected from the group consisting of gamma radiation, low-energy gamma radiation, beta radiation, positron radiation, and a combination thereof.

35. (Currently amended): The system of claim 31, ~~adapted~~ configured for visual co-presentation at least of the position of the intracorporeal radioactive emission probe and of the radioactivity-emitting source, wherein the intracorporeal radioactive emission probe may thus be used as a pointing device.

36. (Currently amended): The system of claim 1, wherein the radioactive emission

probe is an extracorporeal radioactive emission probe, and further including a surgical device, in communication with a surgical position tracking system, for tracking the position of the surgical instrument in a surgical-instrument system-of-coordinates, wherein the data processor is further ~~designed and~~ configured for constructing the image of the radioactivity emitting source and the position of the surgical instrument in a common system-of-coordinates.

37. (Original): The system of claim 36, wherein the surgical instrument is selected from the group consisting of laser probes, cardiac and angioplastic catheters, endoscopic probes, biopsy needles, aspiration tubes or needles, resectoscopes, resecting devices, tissue sampling devices, ultrasonic probes, fiber optic scopes, laparoscopy probes, thermal probes, suction probes, irrigation probes, and open-surgery devices.

38. (Original): The system of claim 36, wherein the surgical instrument further includes a surgical-instrument, intracorporeal, radioactive emission probe.

39. (Currently amended): The system of claim 38, wherein the data processor is configured for constructing the image of the radioactivity emitting source ~~the radioactivity emitting source is~~ labeled with a radiopharmaceutical, particularly suited for in-tandem operation of extracorporeal and intracorporeal radioactive emission probes.

40. (Currently amended): The system of claim 36, ~~adapted~~ configured for visual co-presentation at least of the position of the extracorporeal radioactive emission probe, the surgical instrument, and the radioactivity-emitting source, wherein the surgical instrument may thus be used as a pointing device.

41. (Original): The system of claim 1, and further including a memory unit, for storing the inputs.

42. (Currently amended): The system of claim 1, wherein the data processor is further ~~designed and~~ configured for refining the inputs.

43. (Currently amended): A method for defining an image of a radioactivity emitting source in a system-of-coordinates, the method comprising:

scanning, in a variable-course motion, a radioactivity emitting source with a radioactive emission probe;

monitoring a position of the a radioactive emission probe, as it scans the radioactivity emitting source;

data processing the scanning and the monitoring; and

constructing a first image of the radioactivity emitting source, by the data processing using a plurality of radiation detections detected during said scanning and the position of the probe during said detections as monitored during said monitoring.

44. (Original): The method of claim 43, wherein the variable-course motion includes free-hand scanning.

45. (Original): The method of claim 43, wherein the variable-course motion includes motion along a body lumen.

46. (Previously presented): The method of claim 43, wherein the variable-course motion includes endoscopic motion, through a trocar valve.

47. (Original): The method of claim 43, wherein the variable-course motion includes motion on a linkage system.

48. (Previously presented): The method of claim 43, wherein the monitoring takes place at very short time intervals of between 100 and 200 milliseconds.

49. (Original): The method of claim 43, wherein the data processing further includes utilizing wide-aperture collimation--deconvolution algorithms.

50. (Currently amended): The method of claim 43, wherein the construction of the first image ~~acquisition~~ is performed with a wide-aperture collimator.

51. (Currently amended): The method of claim 43, wherein scanning a radioactivity

emitting source with a radioactive emission probe comprises scanning with a wide-bore-collimator probe and wherein monitoring a position of the a radioactive emission probe comprises monitoring a position of the ~~the radioactive emission probe is a~~ wide-bore-collimator probe.

52. (Currently amended): The method of claim 43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a wide-angle-collimator probe and wherein monitoring a position of the radioactive emission probe comprises monitoring a position of the ~~the radioactive emission probe is a~~ wide-angle collimator probe.

53. (Currently amended): The method of claim 43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a square collimator probe and wherein monitoring a position of the radioactive emission probe comprises monitoring a position of the ~~the radioactive emission probe is a~~ square collimator probe.

54. (Currently amended): The method of claim 43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a ~~the~~ radioactive emission probe which includes a single-pixel radiation detector and a single collimator.

55. (Currently amended): The method of claim 43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a ~~the~~ radioactive emission probe which includes a multi-pixel radiation detector and a single collimator.

56. (Currently amended): The method of claim 43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a grid collimator probe, having a plurality of collimator cells and wherein monitoring a position of the radioactive emission probe comprises monitoring a position of the ~~the radioactive emission probe is a~~ grid collimator probe~~, having a plurality of collimator cells~~.

57. (Currently amended): The method of claim 56, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a grid collimator probe, having a plurality of collimator cells which ~~wherein each of the collimator cells~~ includes a single pixel.

58. (Currently amended): The method of claim 56, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a grid collimator probe, having a plurality of collimator cells which ~~each of the collimator cells~~ includes a plurality of pixels.

59. (Currently amended): The method of claim 43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a~~the~~ radioactive emission probe which includes at least two radiation detectors, each with a dedicated collimator.

60. (Currently amended): The method of claim ~~59~~43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a radioactive emission probe which includes at least two radiation detectors, each with a dedicated collimator, wherein the dedicated collimators are not parallel to each other.

61. (Original): The method of claim 43, wherein constructing includes constructing the first image in two dimensions.

62. (Original): The method of claim 43, wherein constructing includes constructing the first image in three dimensions.

63. (Original): The method of claim 43, wherein the data processing further includes calculating a distance between the radioactive emission probe and the radioactivity emitting source, at each position, based on the different attenuation of photons of different energies, emitted from the radioactivity emitting source.

64. (Original): The method of claim 63, and further including constructing a second image of the radioactivity emitting source, by the data processing, based on the

distance between the radioactive emission probe and the radioactivity emitting source at each position.

65. (Original): The method of claim 64, and further including visually co-presenting the first and second images on a display screen.

66. (Currently amended): The method of claim 43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a ~~the~~ radioactive emission probe which is selected from the group consisting of a narrow-angle radioactive emission probe, a wide-angle radiation emission detector, a plurality of individual narrow angle radiation emission detectors, a spatially sensitive, pixellated, radioactivity detector, a Compton gamma probe, a tube collimator, a detector sensitive to gamma radiation, a detector sensitive to beta radiation, a detector sensitive to positron radiation, a detector sensitive to alpha radiation, and a combination thereof.

67. (Original): The method of claim 43, wherein the radioactive emission probe is operative as a position tracking pointer, by following a three dimensional surface which defines the body curvatures, to define the position of the radioactivity-emitting source with respect to an outer surface of the body and create a three dimensional map of both the radioactivity-emitting source and the body.

68. (Original): The method of claim 67, and further including visually co-presenting the radioactive emission probe.

69. (Original): The method of claim 43, wherein the radioactivity emitting source is selected from the group consisting of a radiopharmaceutically labeled benign tumor, a radiopharmaceutically labeled malignant tumor, a radiopharmaceutically labeled vascular clot radiopharmaceutically labeled inflammation related components, a radiopharmaceutically labeled abscess and a radiopharmaceutically labeled vascular abnormality.

70. (Currently amended): The method of claim 43, wherein monitoring a position of

the a radioactive emission probe comprises monitoring with a~~the~~ position tracking system ~~is~~ selected from the group consisting of an articulated arm position tracking system, an accelerometers based position tracking system, a potentiometers based position tracking system, a sound wave based position tracking system, a radio frequency based position tracking system, an electromagnetic field based position tracking system, an optical based position tracking system, a position tracking system ~~adapted~~ configured for free-hand movement, and a combination thereof.

71. (Currently amended): The method of claim 43, wherein the data processor is further ~~designed and~~ configured for calculating a first position of the radioactivity-emitting source in a first system-of-coordinates and projecting the first position onto a second system-of-coordinates.

72. (Currently amended): The method of claim 43, and further including performing a structural imaging modality, with a structural-modality position tracking system, for constructing a structural image of a body component in a structural modality system-of-coordinates, wherein the radioactivity emitting source is a radiopharmaceutically labeled portion of the body component, and wherein the data processor is further ~~designed and~~ configured for constructing the structural image of the body component and the image of the radiopharmaceutically labeled portion of the body component in a common system-of-coordinates.

73. (Currently amended): The method of claim 72, wherein performing a~~the~~ structural imaging modality comprises performing~~is~~ a two-dimensional imaging modality.

74. (Currently amended): The method of claim 72, wherein performing a~~the~~ structural imaging modality comprises performing~~is~~ a three-dimensional imaging modality.

75. (Original): The method of claim 72, and further including visually co-presenting the body component and the radiopharmaceutically labeled portion of the body component.

76. (Currently amended): The method of claim 72, wherein performing a structural

imaging modality, with a structural-modality position tracking system comprises performing with ~~the~~ a structural ~~imaging~~ modality position tracking system~~is~~ selected from the group consisting of a fluoroscope, a computed tomographer, a magnetic resonance imager, an ultrasound imager, an impedance imager, and an optical camera.

77. (Currently amended): The method of claim 43, and further including a structural imaging modality in communication with the position tracking system, wherein the data processor is further ~~designed and~~ configured for constructing a structural image of the body component and the image of the radioactivity emitting source in a common system-of-coordinates.

78. (Currently amended): The method of claim 43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with ~~the radioactive emission probe is~~ an intracorporeal radioactive emission probe.

79. (Currently amended): The method of claim ~~78~~43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with ~~the radioactive emission probe is~~ an intracorporeal radioactive emission probe, mounted on a surgical instrument.

80. (Currently amended): The method of claim ~~79~~43, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with an intracorporeal radioactive emission probe, mounted on a surgical instrument ~~the surgical instrument is~~ selected from the group consisting of laser probes, cardiac and angioplastic catheters, endoscopic probes, biopsy needles, aspiration tubes or needles, resectoscopes, resecting devices, ablation devices, high-energy ultrasound ablation devices, tissue sampling devices, ultrasonic probes, fiber optic scopes, laparoscopy probes, thermal probes, suction probes, irrigation probes, and open-surgery devices.

81. (Currently amended): The method of claim 78, wherein scanning with a an intracorporeal radioactive emission probe comprises scanning with an~~the~~ intracorporeal radioactive emission probe ~~is adapted~~ configured for detecting

radiation, selected from the group consisting of gamma radiation, low-energy gamma radiation, beta radiation, positron radiation, and a combination thereof.

82. (Original): The method of claim 78, and further including visually co-presenting at least the position of the intracorporeal radioactive emission probe and of the radioactivity-emitting source, wherein the intracorporeal radioactive emission probe may thus be used as a pointing device.

83. (Currently amended): The method of claim 43, wherein the radioactive emission probe is an extracorporeal radioactive emission probe, and further including a surgical device, in communication with a surgical position tracking system, for tracking the position of the surgical instrument in a surgical-instrument system-of-coordinates, wherein the data processor is further ~~designed and~~ configured for constructing the image of the radioactivity emitting source and the position of the surgical instrument in a common system-of-coordinates.

84. (Currently amended): The method of claim 83, wherein including a surgical device comprises including a~~the~~ surgical instrument ~~is~~ selected from the group consisting of laser probes, cardiac and angioplastic catheters, endoscopic probes, biopsy needles, aspiration tubes or needles, resectoscopes, resecting devices, tissue sampling devices, ultrasonic probes, fiber optic scopes, laparoscopy probes, thermal probes, suction probes, irrigation probes, and open-surgery devices.

85. (Currently amended): The method of claim 83, wherein including a surgical device comprises including a~~the~~ surgical instrument ~~further~~ which includes a surgical-instrument, intracorporeal, radioactive emission probe.

86. (Currently amended): The method of claim 85, wherein scanning a radioactivity emitting source comprises scanning a~~the~~ radioactivity-emitting source ~~is~~ labeled with a radiopharmaceutical, particularly suited for in-tandem operation of extracorporeal and intracorporeal radioactive emission probes.

87. (Original): The method of claim 83, and further including visually co-presenting

at least the position of the extracorporeal radioactive emission probe, the surgical instrument, and the radioactivity-emitting source, wherein the surgical instrument may thus be used as a pointing device.

88. (Currently amended): The method of claim 43, and further including storing the data processing in a memory unit~~, for storing the inputs~~.

89. (Currently amended): The method of claim 43, wherein the data processor is further ~~designed and~~ configured for refining the inputs.

90. (Currently amended): A method of nuclear imaging, comprising:

scanning a radioactivity emitting source with a radioactive emission probe having a wide-aperture collimator;

monitoring the position of the radioactive emission probe;

data processing the scanning and the monitoring, while mathematically correcting the scanning for the effect of wide-aperture; and

constructing a first image of the radioactivity emitting source, by the data processing using a plurality of radiation detections detected during said scanning and the position of the probe during said detections as monitored during said monitoring.

91. (Previously presented): The method of claim 90, wherein the monitoring takes place at very short time intervals of between 100 and 200 milliseconds.

92. (Original): The method of claim 90, wherein the data processing further includes utilizing wide-aperture collimation--deconvolution algorithms.

93. (Currently amended): The method of claim 90, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with ~~the radioactive emission probe is~~ a wide-bore-collimator probe.

94. (Currently amended): The method of claim 90, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with ~~the radioactive emission probe is~~ a wide-angle collimator probe.

95. (Currently amended): The method of claim 90, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with ~~the radioactive emission probe is~~ a square collimator probe.

96. (Currently amended): The method of claim 90, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a~~the~~ radioactive emission probe which includes a single-pixel radiation detector and a single collimator.

97. (Currently amended): The method of claim 90, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a~~the~~ radioactive emission probe which includes a multi-pixel radiation detector and a single collimator.

98. (Currently amended): The method of claim 90, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with ~~the radioactive emission probe is~~ a grid collimator probe, having a plurality of collimator cells.

99. (Currently amended): The method of claim 98, wherein scanning with a grid collimator probe, having a plurality of collimator cells comprises scanning with a grid collimator probe, having a plurality of collimator cells wherein each of the collimator cells includes a single pixel.

100. (Currently amended): The method of claim 98, wherein scanning with a grid collimator probe, having a plurality of collimator cells comprises scanning with a grid collimator probe, having a plurality of collimator cells wherein each of the collimator cells includes a plurality of pixels.

101. (Currently amended): The method of claim 90, wherein scanning a radioactivity emitting source with a radioactive emission probe comprises scanning with a~~the~~

radioactive emission probe ~~includes~~ including at least two radiation detectors, each with a dedicated collimator.

102. (Currently amended): The method of claim 101, wherein scanning with a radioactive emission probe including at least two radiation detectors, each with a dedicated collimator comprises scanning with a radioactive emission probe including at least two radiation detectors, each with a dedicated collimator wherein the dedicated collimators are not parallel to each other.

103. (Original): The method of claim 90, wherein constructing includes constructing the first image in two dimensions.

104. (Original): The method of claim 90, wherein constructing includes constructing the first image in three dimensions.

105. (Original): The method of claim 90, wherein the data processing further includes calculating a distance between the radioactive emission probe and the radioactivity emitting source, at each position, calculating a distance between the radioactive emission probe and the radioactivity emitting source, at each position, based on the different attenuation of photons of different energies, emitted from the radioactivity emitting source.

106. (Original): The method of claim 105, and further including constructing a second image of the radioactivity emitting source, by the data processing, based on the distance between the radioactive emission probe and the radioactivity emitting source at each position.

107. (Original): The method of claim 106, and further including visually co-presenting the first and second images on a display screen.

108. (Original): The method of claim 106, wherein the second image is a two dimensional image.

109. (Original): The method of claim 106, wherein the second image is a three dimensional image.

110 - 112. (canceled).

113. (Currently amended): The method of claim 144, wherein <u>scanning along a surface of the body with a radioactive emission probe comprises scanning with</u>~~the radioactive emission probe is~~ a wide-bore-collimator probe.

114. (Currently amended): The method of claim 144, wherein <u>scanning along a surface of the body with a radioactive emission probe comprises scanning with</u>~~the radioactive emission probe is~~ a wide-angle collimator probe.

115. (Currently amended): The method of claim 144, wherein <u>scanning along a surface of the body with a radioactive emission probe comprises scanning with</u> ~~the radioactive emission probe is~~ a square collimator probe.

116. (Currently amended): The method of claim 144, wherein <u>scanning along a surface of the body with a radioactive emission probe comprises scanning with a</u> ~~the~~ radioactive emission probe <u>which</u> includes a single-pixel radiation detector and a single collimator.

117. (Currently amended): The method of claim 144, wherein <u>scanning along a surface of the body with a radioactive emission probe comprises scanning with a</u> ~~the~~ radioactive emission probe <u>which</u> includes a multi-pixel radiation detector and a single collimator.

118. (Currently amended): The method of claim 144, wherein <u>scanning along a surface of the body with a radioactive emission probe comprises scanning with</u> ~~the radioactive emission probe is~~ a grid collimator probe, having a plurality of collimator cells.

119. (Currently amended): The method of claim 118, wherein <u>scanning with a grid</u>

collimator probe, having a plurality of collimator cells comprises scanning with a grid collimator probe, having a plurality of collimator cells wherein each of the collimator cells includes a single pixel.

120. (Currently amended): The method of claim 118, wherein scanning with a grid collimator probe, having a plurality of collimator cells comprises scanning with a grid collimator probe, having a plurality of collimator cells wherein each of the collimator cells includes a plurality of pixels.

121. (Currently amended): The method of claim 144, wherein scanning along a surface of the body with a radioactive emission probe comprises scanning with a ~~the~~ radioactive emission probe includes at least two radiation detectors, each with a dedicated collimator.

122. (Currently amended): The method of claim 121, wherein scanning with a radioactive emission probe including at least two radiation detectors, each with a dedicated collimator comprises scanning with a radioactive emission probe including at least two radiation detectors, each with a dedicated collimator wherein the dedicated collimators are not parallel to each other.

123. (Currently amended): A system for ~~calculating~~ constructing an image of a radioactivity emitting source in a system-of-coordinates, the system comprising:

a radioactive emission probe, of a wide-aperture collimator;

a position tracking system, being in ~~communicating~~ communication with the radioactive emission probe and configured for tracking the position of the probe in the system-of-coordinates; and

a data processor, being ~~designed and~~ configured for receiving data inputs from the position tracking system and from the radioactive emission probe and for constructing the image of the radioactivity emitting source in the system-of-coordinates using a plurality of radiation detections received from the probe and the position of the probe during said detections as received from the position tracking system.

124. (Currently amended): The system of claim 123, wherein the radioactive emission probe of a wide-aperture collimator is ~~adapted~~ configured for a variable course motion.

125. (Original): The system of claim 124, wherein the variable-course motion includes free-hand scanning.

126. (Original): The system of claim 124, wherein the variable-course motion includes motion along a body lumen.

127. (Previously presented): The system of claim 124, wherein the variable-course motion includes endoscopic motion, through a trocar valve.

128. (Original): The system of claim 124, wherein the variable-course motion includes motion on a linkage system.

129. (Currently amended): The system of claim 123, wherein the radioactive emission probe of a wide-aperture collimator is ~~adapted~~ configured for motion within a predetermined track on an immobile gantry.

130. (Currently amended): The system of claim 123, wherein the radioactive emission probe of a wide-aperture collimator is ~~adapted~~ configured for motion within at least two predetermined tracks on an immobile gantry.

131. (Currently amended): The system of claim 123, wherein the radioactive emission probe of a wide-aperture collimator is ~~adapted~~ configured for a system selected from gamma camera and SPECT.

132. (Currently amended): The system of claim 123, wherein the data processor is further ~~designed and~~ configured to utilize an image acquisition and reconstruction algorithm, based on wide-aperture collimation-- deconvolution algorithms, for image resolution enhancement.

133. (Currently amended): The system of claim 123, wherein the radioactive emission probe comprises ~~is constructed as~~ a wide-bore-collimator probe.

134. (Currently amended): The system of claim 123, wherein the radioactive emission probe comprises ~~is constructed as~~ a wide-angle collimator probe.

135. (Currently amended): The system of claim 123, wherein the radioactive emission probe comprises ~~is constructed as~~ a square collimator probe.

136. (Original): The system of claim 123, wherein the radioactive emission probe includes a single-pixel radiation detector and a single collimator.

137. (Original): The system of claim 123, wherein the radioactive emission probe includes a multi-pixel radiation detector and a single collimator.

138. (Currently amended): The system of claim 123, wherein the radioactive emission probe comprises ~~is constructed as~~ a grid collimator probe, having a plurality of collimator cells.

139. (Original): The system of claim 138, wherein each of the collimator cells includes a single pixel.

140. (Original): The system of claim 138, wherein each of the collimator cells includes a plurality of pixels.

141. (Original): The system of claim 123, wherein the radioactive emission probe includes at least two radiation detectors, each with a dedicated collimator.

142. (Original): The system of claim 141, wherein the dedicated collimators are not parallel to each other.

143. (cancelled)

144. (Currently amended): A method of determining a depth of a radioactivity emitting source, in a body, the method comprising:

administering to the body a radiopharmaceutical, labeled with a radionuclide that emits at least ~~a~~ first and ~~a~~ second photon energies;

scanning along a surface of the body, for the radioactivity emitting source, with a radioactive emission probe, tuned for the at least first and second photon energies;

obtaining count rates for the at least first and second photon energies; and

determining depth information of the radioactivity emitting source from the surface of the body, based on the different attenuations of the first and second photon energies.

145. (Previously presented): The method of claim 144, wherein the determining depth information further includes calculating depth information, in accordance with the equation:

d = ln { [I (E.sub.1) / I (E.sub.2)] / [I.sub.0 (E.sub.1) / I.sub.0 (E.sub.2)] } / [.mu.(E.sub.2) - .mu.(E.sub.1)]

wherein:

d is the depth of the radioactivity emitting source from the surface of the body;

I.sub.0 (E.sub.1) / I.sub.0 (E.sub.2) is the ratio of initial intensities of the first and second photon energies, at the radioactivity emitting source;

I (E.sub.1) / I (E.sub.2)is the ratio of intensities of the first and second photon energies, being the count rates for the first and second photon energies, as measured at the surface of the body, by the radioactive emission probe; and

.mu.(E.sub.1) and .mu.(E.sub.2) are the tissue attenuation coefficients for the first and second photon energies, respectively.

146. (Previously presented): The method of claim 144, wherein the determining depth information further includes determining three dimensional depth information of the radioactivity emitting source.

147. (Previously presented): The method of claim 144, wherein the radioactive emission probe is associated with a position tracking system, and the method further includes:

monitoring the position of the radioactive emission probe, as it scans;

calculating the depth of the radioactivity emitting source, at each position; and

constructing an image of the radioactivity emitting source, the image being selected from the group consisting of a two dimensional image and a three dimensional image.

148. (Currently amended) An intracorporeal-imaging head, comprising:

a housing, which comprises:

at least one radioactive-emission probe, mounted on said housing, ~~adapted to image~~configured for imaging radioactive-emission from at least two different viewing angles of a portion of a tissue without movement of the housing; ~~and~~

an imaging system ~~adapted to image~~configured for imaging said portion; and

a data processor configured for constructing an image using a plurality of radioactive-emission images received from the probe and images received from the imaging system.

149. (Previously presented) The intracorporeal imaging head of claim 148 wherein the imaging system is one of a fluoroscope, a computed tomographer, a magnetic resonance imager, an ultrasound imager, an impedance imager, and an optical camera.

150. (Previously presented) The intracorporeal imaging head of claim 148 wherein the at least one radioactive-emission probe is at least one wide-angle collimator probe.

151. (Previously presented) The intracorporeal imaging head of claim 150 wherein the wide-angle collimator probe has a viewing angle of between 81° and 280°.

152. (Currently amended) An intracorporeal-imaging head, comprising:

a housing, which comprises:

at least one radioactive-emission probe, mounted on said housing, ~~adapted to image~~configured for imaging radioactive-emission from at least two different viewing angles of a portion of a tissue without movement of the housing; and

a position tracking system in a fixed positional relation with said at least one radioactive-emission probe, for providing positional information for said at least one radioactive-emission probe; and

a data processor configured for constructing an image using a plurality of images received from the probe and the position of the probe during the imaging of said images as received from the position tracking system.

153. (Previously presented) The intracorporeal imaging head of claim 152 wherein the position tracking system is one of a fluoroscope, a computed tomographer, a magnetic resonance imager, an ultrasound imager, an impedance imager, and an optical camera.

154. (Currently amended) The intracorporeal imaging head of claim 152 wherein the position tracking system is ~~adapted to track~~configured for tracking acoustic electromagnetic radiation or magnetic fields.

155. (Previously presented) The intracorporeal imaging head of claim 152 wherein the at least one radioactive-emission probe is at least one wide-angle collimator probe.

156. (Previously presented) The intracorporeal imaging head of claim 155 wherein the wide-angle collimator probe has a viewing angle of between 81° and 280°.

157. (Previously presented) A flexible probe, comprising:

an intracorporeal imaging head according to claim 152; and

an ultrasonic imager sized for rectal insertion for imaging of prostate.

158. (Previously presented) A flexible probe, comprising:

an intracorporeal imaging head according to claim 152; and

an optical imager sized for rectal insertion for imaging of colon.

159. (New) A system according to claim 1, wherein the data processor being configured to construct an image further comprises the data processor being configured for tomographicly reconstruct the image.

160. (New) A method according to claim 43 wherein constructing a first image comprises tomographically reconstructing a first image.

161. (New) A method according to claim 90 wherein constructing a first image comprises constructing a first image using a deconvolution algorithm.

162. (New) A system according to claim 123, wherein the data processor being configured to construct an image further comprises the data processor being configured to construct the image using a deconvolution algorithm.

163. (New) An imaging head according to claim 148, wherein the data processor is configured for constructing the image wherein the intensity of the image is a function of the time intervals between the plurality of images received from the probe.

164. (New) An imaging head according to claim 152, wherein the data processor is configured for constructing the image wherein the intensity of the image is a function of the time intervals between the plurality of images received from the probe.